

# **OPERATING EXPERIENCE WEEKLY SUMMARY**

**Office of Nuclear and Facility Safety**

**October 16 - October 22, 1998**

**Summary 98-42**

# Operating Experience Weekly Summary 98-42

October 16 through October 22, 1998

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## **EVENTS**

### **1. FAILURE TO INSPECT TRANSURANIC WASTE DRUM VENTS AT ROCKY FLATS**

On September 21, 1998, at the Rocky Flats Environmental Technology Site Plutonium Processing and Handling Facility, an inspector performing a monthly residue drum vent inspection discovered two transuranic waste drums whose vents were covered by tamper-indicating devices, violating the facility Basis for Interim Operation. The accident analysis in Basis for Interim Operation assumes drums are properly vented, reducing the frequency of hydrogen explosions and resulting in lower risk class reduction categorizations. The facility manager reviewed this event and, on October 13, reported a potential unreviewed safety question because there is no program to inspect and test transuranic waste drum vents. (ORPS Report RFO--KHLL-371OPS-1998-0076)

Investigators determined that when the inspector discovered the blocked vents he poked a hole in the tamper-indicating devices with a pencil to open a vent path. The inspector noted that one drum vented for over a minute after he opened the vent path, indicating gas accumulation within the drum. Investigators also determined that no one evaluated the potential hazards associated with the inspector's actions. They believe that the inspector's actions could have induced a spark, which in turn could have ignited the drum. Investigators also determined that an inventory control program manager categorized this event as being below the level of concern and did not implement any corrective actions. The DOE facility representative team questioned this categorization and believes that a potential unreviewed safety question exists. The program manager reviewed this event because it had elicited different opinions. He then elevated the event categorization, established controls to prevent drum handling until vent paths have been confirmed, and directed facility personnel to perform an unreviewed safety question determination.

The facility manager held a fact-finding meeting. Meeting attendees learned that 20 additional drums in the facility, as well as some drums in a support facility, still require vent inspections. They learned that no one inspected the transuranic waste drums because funding was only provided for residue drums. Nuclear safety personnel believe that the fact that these drums are not part of the drum venting inspection program could pose an unreviewed safety question. Meeting attendees learned that other facilities will be affected, depending on what their specific authorization bases assume. Nuclear safety personnel will evaluate other facilities that may have received transuranic waste drums from the Plutonium Processing and Handling Facility. The facility manager will continue to review this event and will develop corrective actions as necessary.

NFS has reported several events regarding failure to perform surveillances. Following are some examples.

- Weekly Summary 98-07 reported that workers at the Mound Plant Tritium Facilities determined that a data-logging computer for radiation monitoring systems had been off-line for nine days, even though the revised operational controls (authorization basis) manual for the facility required daily surveillance of the computer. Investigators determined that site personnel updated an operational control manual and managers approved it for use on December 5, 1997. Verification of data-logging computer operability was not required in the previous version of the manual, and facility managers failed to incorporate the new surveillance requirements into facility practices. (ORPS Report OH-MB-BWO-BWO01-1998-0003)

- Weekly Summary 98-05 reported two events involving a failure to conduct surveillances and inspections on time. Facility personnel at the Hanford Tank Farm discovered that functional tests for the high-efficiency particulate air filter differential pressure interlocks and the stack high-radiation alarm were not current. Investigators determined that no one had entered facility safety documentation changes into the computerized planned maintenance system used to schedule surveillances. At the East Tennessee Technology Park (K-25 Site), fire protection personnel reviewing inspection and test records discovered that the database contained no inspection records for five building sections. Investigators also determined that the computerized fire inspections management information system had failed to schedule several monthly fire department surveillances. (ORPS Reports RL--PHMC-TANKFARM-1998-0010 and ORO--LMES-K25GENLAN-1998-0003)

These events illustrate the importance of properly tracking, scheduling, and conducting surveillances. Managers need to ensure that surveillance requirements are incorporated into facility practices. Hazardous materials must be adequately tracked to ensure facilities remain within their authorization bases documents. The Rocky Flats event also points out the importance of independent verification for material and components that must meet requirements to maintain the facility within established safety limits. These verifications are necessary to ensure that no increased risk to the facility, facility personnel, or the public exists. DOE contractors who operate nuclear facilities and fail to conduct required surveillances or implement corrective actions for identified deficiencies could be subjected to Price-Anderson civil penalties under the work processes and quality improvement provisions of 10 CFR 830.120, *Quality Assurance Requirements*. DOE facility managers should review their surveillance practices to ensure that scheduled frequencies are as specified in their safety documentation.

Facility managers should review the following information and then communicate to facility personnel the importance of adequately reflecting the facility design bases in authorization bases documents. Facility managers should also review the following guidance and ensure that events are adequately characterized and corrective actions are effectively implemented to reduce the recurrence of events.

- DOE O 5480.21, *Unreviewed Safety Questions*, establishes program requirements to evaluate the impact of changing conditions that may affect authorization bases. It also ensures that DOE has the approval authority for changes that introduce new hazards and higher-than-approved risks to the public and facility workers. The Order states that when changes are made to the facility, three criteria are used to identify unreviewed safety questions: (1) if the probability of occurrence or the consequences of an accident that is analyzed in the safety analysis report are changed; (2) if the possibility of an accident of a different type than analyzed in the report may be created; and (3) if the margin of safety, as defined in any technical specification, is reduced.
- DOE O 5480.22, *Technical Safety Requirements*, attachment 1, describes the purpose of surveillance requirements and states that each surveillance shall be performed within the specified interval.
- DOE O 5480.23, *Nuclear Safety Analysis Reports*, states that nuclear facilities and operations must be analyzed to (1) identify all hazards and potential accidents associated with the facility and the process systems, components, equipment, or structures and (2) establish design and operational means to mitigate these

hazards and potential accidents. The results of these analyses are to be documented in safety analysis reports.

- DOE-STD-1004-92, *Root Cause Analysis Guidance Document*, chapter 6, "Corrective Actions," states that proposed corrective actions should be (1) reviewed to ensure the appropriate criteria are met, (2) prioritized, (3) scheduled, (4) entered into a commitment tracking system, and (5) implemented in a timely manner. It states that a complete corrective action program should be based on specific causes of the occurrence, lessons learned from other facilities, appraisals, and employee suggestions. It also states that a successful program requires management involvement at the appropriate level and willingness to take responsibility and allocate adequate resources for corrective actions.
- DOE/NS-0013, Safety Notice 93-1, *Fire, Explosion, and High-Pressure Hazards Associated with Waste Drums and Containers*, February 1993, describes lessons learned on safe storage and handling of waste containers and drums. The notice specifically discusses handling, storing, venting, and opening containers suspected of being pressurized or containing flammable vapors.
- DOE/EH-0502, Safety Notice 95-02, *Independent Verification and Self-Checking*, September 1995. This notice provides guidance and good practices for performing independent verification.

Safety Notices 93-1 and 95-02 can be obtained by contacting the ES&H Information Center, (800) 473-4375, or by writing to U.S. Department of Energy, ES&H Information Center, EH-72, 19901 Germantown Rd., Germantown, MD 20874. Safety Notices are also available on the OEAF website, [http://tis.eh.doe.gov:80/web/oeaf/lessons\\_learned/ons/ons.html](http://tis.eh.doe.gov:80/web/oeaf/lessons_learned/ons/ons.html).

**KEYWORDS:** drum, vent, unreviewed safety question

**FUNCTIONAL AREAS:** Licensing/Compliance, Material Handling/Storage, Surveillance, Technical Support

## 2. IMPROPER BYPASS OF DOOR SAFETY INTERLOCK TO X-RAY AND LASER EQUIPMENT

On October 15, 1998, at the Nevada Test Site, Los Alamos National Laboratory personnel performing a series of integrated dry runs discovered that three interlocks on the experiment room door were taped in a bypassed condition. The preliminary inquiry concluded that the bypassing might have taken place the preceding evening, when Bechtel Nevada personnel were ensuring that two class IV lasers were correctly aligned for the integrated dry runs. The test group director has prohibited the operation of x-ray and laser equipment until the incident is fully evaluated. If such equipment is operating while an interlock is overridden, entry into the area will

not shut the equipment down, and personal injury could occur. (ORPS Report NVOO--LANV-NTS3-1998-0004)

Investigators determined that Bechtel Nevada workers attempting to identify which interlock was connected to the laser systems had systematically taped the door interlock devices in a bypassed condition, in violation of the approved operating procedure. They also determined that the workers forgot to remove the tape before the dry runs. The investigators concluded that since the experiment room door had cipher locks and access was administratively controlled, there was no chance of personnel exposure or injury.

NFS reported laser safety violations in several Weekly Summaries. Some examples follow.

- Weekly Summary 98-05 reported that a “participating guest” was operating a class II laser without authorization at Lawrence Livermore National Laboratory. The guest operated the laser with the interlocks bypassed and without an approved project work plan. He also operated a class IIIB, cadmium/helium laser with the interlocks bypassed and without an approved project work plan. (ORPS Report SAN--LLNL-LLNL-1998-0007)
- Weekly Summary 97-47 reported that experimenters at the Ames Laboratory left a class IIIB laser operating unattended, in violation of laboratory laser safety requirements. Investigators determined that the operator had not been given the mandatory laser and high-voltage safety training. They also determined that the operator should have performed the operation with the door closed but had propped it open the door for convenience. (ORPS Report CH--AMES-AMES-1997-0003)
- Weekly Summary 96-48 reported that a security technician at Lawrence Livermore National Laboratory was hit in the eyes by the reflected beam from an operating class IIIB laser when he entered a room to work on an interlock status panel. Investigators determined that a lead experimenter had left the laser on overnight, in violation of laboratory laser safety requirements. An ophthalmologist determined that there was no permanent damage to the employee's eyes. (ORPS Report SAN--LLNL-LLNL-1996-0060)

These events illustrate the hazards associated with the operation of x-ray and laser devices. Managers of facilities using this equipment should ensure that personnel understand hazard controls unique to their operations. Training should include information from the following.

- ANSI Z136.1-1993, *American National Standard for the Safe Use of Lasers*, provides guidance for the safe use of lasers and laser systems by defining hazard control measures for each of the four laser classifications. Control measures include (1) engineering controls, such as beam housings, beam shutters, and attenuators; (2) administrative controls, such as procedures, warning signs, labels, and training; and (3) personal protective equipment, such as eyewear, gloves, and special clothing.
- ANSI N43.2-1977, *Radiation Safety for X-Ray Diffraction and Fluorescence Analysis Equipment*, provides guidelines specific to the radiation safety aspects of the design and operation of x-ray diffraction and fluorescence analysis equipment. Section 6.5 addresses equipment repair and alignment.

**KEYWORDS:** laser, x-ray, interlock, procedure

**FUNCTIONAL AREAS:** Configuration Control, Operations

### 3. **AIRBORNE CADMIUM LEVELS AT IDAHO EXCEED PROTECTION FACTORS FOR RESPIRATORY PROTECTION**

On October 15, 1998, at the Idaho Waste Experimental Reduction Facility, industrial hygienists determined that two workers had been exposed to levels of airborne cadmium dust that exceeded the protection factor for the respiratory protection equipment they were using. Individual workers could have been exposed to as much as 1.16 and 2.68 times the OSHA permissible exposure levels for cadmium dust of 5 micrograms per m<sup>3</sup>. The workers were cleaning and inspecting an incinerator off-gas heat exchanger on September 9 following a test burn for equipment qualification. In addition, other workers were exposed to unknown concentrations of cadmium dust on October 13 while performing similar work. This event is significant because acute exposure to cadmium can cause acute pulmonary edema or death, and chronic exposures can cause kidney damage and lung or prostate cancer. (ORPS Report ID--LITC-WERF-1998-0007)

Industrial hygienists determined from the results of breathing zone air samples taken outside the hood that on September 9, one worker was exposed to 29 and the other worker to 67 times this level, before protection factors are applied. The workers were wearing air-supplied hoods with a protection factor of 25 for cadmium dust. The facility manager ordered accelerated processing of personal lapel samplers for the workers involved in the cleaning operations on October 13 and held a critique of the occurrence. Attendees learned the following.

- Test burns entail operating the incinerator over several days, during which known amounts of various materials are injected to evaluate performance. Metallic cadmium was one of the materials injected prior to the cleaning and inspection activity on September 9.
- Although facility operators encountered cadmium dust above the permissible exposure limit in the heat exchanger during past cleanings, they did not expect the very high levels encountered on September 9. Past exposure levels had been well within the protection factor of the air-supplied hood.
- Work planners followed the facility's Lead and Cadmium Compliance Plan and workers followed the work plan and procedures for conducting the work.
- Engineers believed that the operating temperature of the incinerator would preclude precipitation of significant amounts of cadmium onto the heat exchanger.

The facility manager directed facility personnel to revise the Lead and Cadmium Compliance Plan to require a more protective respirator, and also to develop more effective engineering and administrative controls to mitigate cadmium hazards. Industrial hygienists arranged for medical evaluation of the workers involved in the September 9 occurrence. Laboratory results for one of the workers showed no uptake and results are pending for the other worker.

NFS has reported on several incidents where work planners have specified inadequate respiratory protection. Following are some examples.

- Weekly Summary 98-19 reported that the DOE manager of the Idaho National Engineering and Environmental Laboratory Waste Reduction Operations Complex transmitted a surveillance report to the contractor manager identifying deficiencies in the contractor's program for controlling worker exposure to lead and cadmium at the Waste Experimental Reduction Facility incinerator baghouse. The facility manager prohibited entry into the baghouse until facility personnel had developed and implemented effective engineering and administrative hazard controls. Inadequate hazard analysis and control caused at least one worker to be exposed to airborne lead and cadmium dust that exceeded OSHA limits. (ORPS Report ID--LITC-WERF-1998-0004)
- Weekly Summary 98-14 reported that facility managers at the Savannah River Technology Center determined that the lead compliance program did not provide adequate guidance for protecting workers. Based on the program deficiencies identified by these managers, the center's operations manager prohibited all lead handling performed without industrial hygienist approval. (ORPS Report SR--WSRC-LTA-1998-0012)
- Weekly Summary 96-05 reported that two operators and a health physicist at Hanford Analytical Laboratory were exposed to hazardous vapors while working in a contamination confinement structure. The exposures occurred because operators were wearing powered air-purifying respirators that were inappropriate for the confined atmosphere. Investigators determined that no one had reviewed the material safety data sheet for a stripcoat that the operators used during preparation of the work package or during the pre-job briefing. (ORPS Report RL--WHC-ANALLAB-1996-0006)

These events underscore the importance of performing a thorough activity hazard analysis. Work planners at Idaho specified respiratory protection based on past experience but did not give adequate attention to factors that would have affected cadmium contamination levels in more recent operations. It is often difficult or impossible to measure concentrations of airborne contaminants in real time. Analysis of swipes, scrapings, or breathing zone samples may require up to several days to complete. Samples of an atmosphere or surfaces before work begins are generally unreliable indicators of the contamination that could be introduced as work progresses. Uncertainties surrounding contamination levels that could be encountered during work dictate highly conservative approaches to selecting and using respiratory protection equipment. Industrial hygienists and work planners should review the following guidance.

- DOE 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, requires all DOE elements to identify existing and potential workplace hazards and evaluate the risk of associated worker injury or illness. The Order also requires DOE elements to assess worker exposure to chemical, physical, biological, or ergonomic hazards through appropriate workplace monitoring (including personal, area, wipe, and bulk sampling), biological monitoring, and observation.
- 29 CFR 1910.1000, *Airborne Contaminants*, states that, whenever feasible, compliance with exposure limits for airborne contaminants must first be achieved by determining and implementing administrative or engineering controls. When administrative or engineering controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within prescribed limits.
- 29 CFR 1910.134, *Respiratory Protection*, states that whenever respirators are required to protect the health of the employees, the employer shall establish and



implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect changes in workplace conditions that affect respirator use. The standard also states that when employers cannot identify or reasonably estimate the employee exposure, they shall consider the atmosphere immediately dangerous to life and health, which requires use of a full-face, pressure-demand self-contained breathing apparatus or supplied-air respirator with an auxiliary self-contained air supply.

When exposure to cadmium is expected, work planners should also review 29 CFR 1910.1027, *Cadmium*, for information to develop work plans and monitoring programs. The standard states that if initial monitoring reveals employee exposures to be at or above the permissible exposure level, the employer shall monitor at a frequency and pattern needed to assure the adequacy of respiratory selection and the effectiveness of engineering and work controls. 29 CFR 1910.1027, Appendix A, *Substance Safety Data Sheet - Cadmium*, provides comprehensive descriptions of the acute and chronic effects of exposure to cadmium.

OSHA standards are available at the OSHA website, [http://www.osha-slc.gov/OshStd\\_toc/OSHA\\_Std\\_toc.html](http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc.html).

**KEYWORDS:** hazard analysis, industrial hygiene, respirator, work planning

**FUNCTIONAL AREAS:** Industrial Safety, Work Planning

#### 4. PYROPHORIC REACTION DURING GLOVEBOX SIZE-REDUCTION

On October 12, 1998, at the Rocky Flats Environmental Technology Site, a decontamination and decommissioning worker was size-reducing a glovebox inside a soft-sided containment tent when a pyrophoric reaction occurred, resulting in flames being emitted from a furnace vacuum pipe that he was cutting. Personnel in the area believe that the flames and sparking lasted 10 to 20 seconds before they extinguished themselves. The worker immediately stopped cutting, left the band saw he was using in place, and moved to an exit area inside the tent. Investigators determined that the flames resulted in an estimated 1.6 million derived air concentration inside the tent.

Investigators determined that all personnel inside the containment tent were wearing PremAire® suits. They determined that the workers attended a pre-evolution briefing before starting the work and that they were made aware of the fact that the glovebox had been used for plutonium hydride operations. They believe that the vacuum pipe contained plutonium hydride that was covered by an oxide layer and that when the band saw cut through the pipe the oxide layer was displaced, exposing the plutonium hydride to air and causing it to ignite.

The facility manager held a fact-finding meeting. Meeting attendees learned that before planning the size-reduction of this glovebox, planners had consulted personnel who worked in the hydride laboratory and that the identified plutonium hydride hold-up could be in the piping. They also learned that although the workers were trained in the use of magnesium oxide it is was not in the tent when the event occurred, but was available outside the tent. Magnesium oxide is the most effective agent for extinguishing plutonium fires. The facility manager directed facility personnel to ensure magnesium oxide is available in the containment tent to extinguish fires. He will develop additional corrective actions as necessary.

NFS reported pyrophoric events in the Weekly Summary. Following are some examples.

- Weekly Summaries 98-22 and 98-11 reported that a technician at the Argonne National Laboratory—West Fuels Manufacturing Facility who was consolidating cans of passivated uranium hydride in an air atmosphere glovebox opened one can. This produced a spark that started a fire in two cans. Investigators determined that although facility personnel had assumed the uranium hydride was passivated, it actually contained a uranium corrosion product. The technician poured MET-L-X powder (a fire-extinguishing agent) on the fire to extinguish it, exited the area, and notified fire department personnel that the MET-L-X had failed to extinguish the fire. The investigation team completed the accident investigation report in April and OEAF engineers reported the results. It identified a lack of understanding of the nature of corrosion products as the root cause of the event. The report contains valuable lessons for other DOE facilities. (Investigation Report ORPS No. CH-AA-ANLW-FMF-0001, "Argonne National Laboratory-West Site Uranium Corrosion Product Fire March 13, 1998," issued April 1998; ORPS Reports CH-AA-ANLW-FMF-1998-0001, CH-AA-ANLW-FMF-1998-0002, and CH-AA-ANLW-FMF-1998-0003)
- Weekly Summary 97-48 reported that facility managers at the Hanford Site Plutonium Finishing Plant determined that an unreviewed safety question existed after they examined a photograph of an unexpected reaction that had occurred when operators opened a plutonium storage can. On December 23, 1996, operations personnel noticed a spark when they opened the plutonium storage can inside a glovebox. They had observed reactions before and believed they were caused by statically induced sparks; however, this time the reaction was captured on videotape. On May 30, 1997, facility personnel reviewed a still photograph made from the videotape and determined that the reaction seemed to be a flash of fire rather than a statically induced spark. Based on the photograph and technical reviews, technical support personnel determined that a pressure excursion large enough to blow out a glovebox window could occur when the storage cans are opened. Investigators believe the event was caused by air reacting with plutonium hydride inside the can. Corrective actions included designing a can that can be opened in a safe and controlled manner without producing static. (ORPS Report RL--PHMC-PFP-1997-0027)

These events illustrate the importance of using caution when working with processes involving pyrophoric metals. Personnel engaged in such activities should fully understand the potential reactions associated with materials used in the process. Hazards that could cause or contribute to the severity of a combustible metal fire should be identified by a hazard analysis, and measures to minimize the hazards should be implemented.

The Secretary of Energy issued "DOE Response to the May 14, 1997, Explosion at Hanford's Plutonium Reclamation Facility" on August 4, 1997. This memorandum states: "DOE field offices must reassess known vulnerabilities (chemical and radiological) at facilities that have been shut down, are in standby, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years." It also states: "DOE and contractor field organizations must assess the technical competence of their staffs to recognize the full range of hazards presented by the materials in their facilities, act on results, and implement training programs where needed."

The following documents provide useful information about handling, packaging, and storing of pyrophoric materials, as well as hazard analysis.

- DOE O 5480.23, *Nuclear Safety Analysis Reports*, requires hazard analysis to ensure comprehensive, integrated, and balanced risk management of all safety

and environmental hazards. Section 3 requires analyses of expected releases, exposures, and accidents. It also requires consideration of residual risks to ensure that the risks and consequences of operation are acceptable and to ensure conformance with safety design objectives.

- DOE-STD-3013-96, *Criteria for Preparing and Packaging Plutonium Metals and Oxides for Long-Term Storage*, provides a summary of packaging and storage criteria for plutonium metals. It states that plutonium materials must be in stable forms and packaged in containers designed to maintain their integrity under normal storage conditions and during anticipated handling accidents. A copy of the standard is available at <http://www.doe.gov/html/techstds/standard/standard.html>.
- DOE-HDBK-1081-94, *Primer on Spontaneous Heating and Pyrophoricity*, provides information for the identification and prevention of potential spontaneous combustion hazards. The handbook contains information on the effects that atmospheric oxygen, moisture, heat transfer, and specific areas have on spontaneous heating and ignition. It also identifies metals and gases known to be pyrophoric, acceptable methods for long-term storage, proper extinguishing agents (such as Met-L-X), and additional sources of reference materials available on these subjects. Plutonium reacts at an accelerated oxidation rate when heated to its ignition temperature. Finely divided metal and turnings ignite readily and achieve a high initial temperature that lasts until melting occurs and the surface is reduced. A plutonium fire should not be approached without protective clothing and respirators unless it is enclosed in a glovebox. The most effective agent for extinguishing plutonium fires is magnesium oxide sand. Using water to extinguish the fire is acceptable if criticality safety considerations are not a concern. The handbook can be found at <http://www.doe.gov/html/techstds/standard/standard.html>.
- National Fire Protection Association, *Fire Protection Handbook*, chapter 4-16, "Metals," provides guidance on the fire hazard properties of combustible metals, including uranium. It states that uranium is subject to spontaneous ignition and that fires have occurred spontaneously after prolonged exposure to moist air. Ordering information for NFPA documents may be found at the NFPA website, <http://www.nfpa.org>.
- The *Hazard and Barrier Analysis Guide* discusses barriers that provide controls over hazards associated with a job. Barriers may be physical barriers, procedural barriers, administrative barriers, or human action. Their reliability is important in preventing undesirable events such as fires. The reliability of a barrier is determined by its ability to resist failure. Barriers can be imposed in parallel to provide defense-in-depth and to increase the margin of safety. The *Hazard and Barrier Analysis Guide* provides a detailed analysis for selecting optimum barriers, including a matrix that displays the effectiveness of different barriers in protecting against some common hazards. A copy is available at <http://tis.eh.doe.gov:80/web/oeaf/tools/hazbar.pdf>.

**KEYWORDS:** uranium, fire, pyrophoric materials

**FUNCTIONAL AREAS:** Licensing/Compliance, Materials Handling/Storage, Hazards Analysis, Operations

## **PRICE-ANDERSON AMENDMENTS ACT (PAAA) INFORMATION**

### **1. PRELIMINARY NOTICE OF VIOLATION AT LOS ALAMOS**

On September 21, 1998, the DOE Office of Enforcement and Investigation issued a Preliminary Notice of Violation and waived proposed civil penalties to the Los Alamos National Laboratory under the Price-Anderson Amendments Act. The Notice describes numerous failures at the Chemistry and Metallurgy Research Facility to implement established radiological protection requirements and quality controls to protect workers and the public. Investigators concluded that these failures are likely to represent violations of 10 CFR 830.120, *Nuclear Safety Management*, and 10 CFR 835, *Occupational Radiation Protection*. The Los Alamos National Laboratory is exempt from civil penalty by statute; however, the Notice states that DOE would otherwise have issued a proposed imposition of civil penalty for a total of \$112,500. (NTS-ALO-LA-LANL-LANL-1998-0001)

An Enforcement Letter dated July 7, 1997, described a DOE decision not to take enforcement action for a fire and explosion at the Chemistry and Metallurgy Research Facility in view of plans and commitments by Los Alamos National Laboratory managers to correct work planning and work control problems. (NTS-ALO-LA-LANL-LANL-1997-0002) However, in the Preliminary Notice of Violation, DOE expressed concern over continuing work control problems and failure by managers to address problems in a more timely and effective manner.

The Office of Investigation and Enforcement staff identified numerous events and classified each as one of four Severity Level II violations in the Preliminary Notice of Violation. The proposed civil penalty (waived) is \$28,125 for each of the following violations.

#### **INADEQUATE WORK CONTROLS AND NONADHERENCE TO PROCEDURES**

Investigators identified 12 instances in which facility personnel had not performed work in accordance with established administrative controls using approved procedures or had not developed, maintained, or implemented administrative controls and procedural requirements to maintain personnel radiation exposures as low as reasonably achievable.

#### **QUALITY IMPROVEMENT DEFICIENCIES**

Investigators identified two instances in which corrective actions had failed to prevent recurrence, demonstrating that facility managers had not adequately established and implemented processes to detect and prevent quality problems. Corrective actions implemented after a fire and explosion were ineffective in preventing similar safety-related problems, leading facility management to stand-down all normal operations. Following a reversal of glovebox airflow, facility personnel did not issue a nonconformance report to initiate corrective action and did not control the ventilation system to preclude its use.

#### **RADIOLOGICAL CONTROL PROGRAM NONCOMPLIANCES**

Investigators identified six instances in which facility personnel had not monitored adequately for radiological hazards, had not maintained controls to prevent the inadvertent transfer of radioactive materials out of a controlled zone, had not posted the access point to a contamination area, or had not maintained personnel entry control for potential radiological hazards.

#### **HOT CELL EVENT RADIOLOGICAL CONTROL NONCOMPLIANCES**

Investigators determined that facility personnel had not posted a hot cell containing radioactive materials as a high radiation area, had not maintained control features, alarm devices, or locked entryways to the hot cell, and had not maintained positive control over access to the hot cell when personnel access was required. A source inside the hot cell measured approximately 175 rem per hour of penetrating radiation at one foot.

NFS has reported recent Notices of Violations under the Price-Anderson Amendments Act in Weekly Summaries 98-41, 98-40, 98-26, 98-15, and 98-11.

Under the provisions of the Price-Anderson Amendments Act, DOE can fine contractors for violations of Department rules, regulations, and compliance orders relating to nuclear safety requirements. DOE contractors who operate nuclear facilities or perform nuclear activities and fail to remain in compliance with such requirements could be subjected to Price-Anderson civil penalties under the work processes and quality improvement provisions of 10 CFR 830.120, *Quality Assurance Requirements*, and/or 10 CFR 835, *Occupational Radiation Protection*. These actions include Notices of Violation and, where appropriate, nonreimbursable civil penalties.

The primary consideration for determining whether DOE takes enforcement action is the actual or potential safety significance of the violation, coupled with how quickly the contractor acts to identify and correct problems. The Office of Enforcement and Investigation may reduce penalties when a DOE contractor promptly identifies a violation, reports it to DOE, and undertakes timely corrective action. DOE has the discretion to decide not to issue a Notice of Violation in certain cases.

The Noncompliance Tracking System (Weekly Summaries 95-17 and 95-20) provides a means for contractors to promptly report potential noncompliances and take advantage of provisions in the enforcement policy. DOE-STD-7501-95, *Development of DOE Lessons Learned Programs*, discusses management responsibility for incorporating appropriate corrective actions in a timely manner.

**KEYWORDS:** enforcement, Price-Anderson Act, quality assurance, radiation protection, work control, work planning

**FUNCTIONAL AREAS:** Lessons Learned, Management, Radiation Protection, Work Planning

## 2. PRELIMINARY NOTICE OF VIOLATION AND PROPOSED CIVIL PENALTY AT SAVANNAH RIVER

On September 21, 1998, the DOE Office of Enforcement and Investigation issued a Preliminary Notice of Violation and proposed civil penalties under the Price-Anderson Amendments Act to Westinghouse Savannah River Company. The Notice describes proposed violations of workers' and managers' failures to submit job-specific bioassay samples over a two-year period and failures of the corrective action program to resolve these deficiencies. Investigators determined that the deficiencies represent violations of 10 CFR 830, *Nuclear Safety Management*, and proposed a total civil penalty of \$75,000. DOE stated in the Notice transmittal letter that it opted to defer regulatory action with regard to 10 CFR 835, *Occupational Radiation Protection*, at this time, and that it is "concerned with Westinghouse's failure to implement established, written requirements of its own internal dosimetry program as committed to in its Radiation Protection Program." (NTS Report NTS-SR--WSRC-ESH-1997-0001)

The Office of Enforcement and Investigation staff identified multiple deficiencies and classified them as Severity Level II violations in the Preliminary Notice of Violation. Severity Level II

violations are significant violations that demonstrate a lack of attention or carelessness toward safety that could have adverse impacts. The violations included the following.

#### **INADEQUATE BIOASSAY PROGRAM PARTICIPATION**

- Investigators determined that workers did not adhere to bioassay procedural requirements from January 1, 1996, to September 30, 1997. Specifically, (1) workers did not submit bioassay samples as required, (2) managers did not hold workers and their supervisors responsible for failures to submit bioassay samples, (3) no one documented names and social security numbers of workers required to submit job-specific bioassay samples or notified the bioassay customer representative for tracking purposes, and (4) facility personnel did not always identify the bioassay requirements on the radiological work permits.
- Between January 1, 1996, and September 20, 1997, Westinghouse Savannah River Company Facility Evaluation Board reports identified that (1) some workers did not submit job-specific bioassay samples because there were no incorrect bioassay programs, (2) no one consistently provided line managers with a bioassay schedule report for review, job-specific bioassay sampling requirements were not always identified on radiological work permits, and no one ensured that new employees were placed on the correct bioassay schedule, and (3) no one routinely reviewed bioassay assignments when workers received their annual whole body counts.

These violations represented \$37,500 of the proposed civil penalty.

#### **QUALITY IMPROVEMENT**

- Investigators determined that corrective actions from a previous event did not prevent recurrence of this event. Specifically, in November 1995 DOE identified that 23 percent of workers had not submitted job-specific bioassay samples as required, so Westinghouse Savannah River Company implemented corrective actions. However, worker nonparticipation continued through 1996 and increased to 79 percent of workers on job-specific radiation work permits by the second quarter of 1997.

This violation represented \$37,500 of the proposed Civil Penalty.

Westinghouse Savannah River Company managers are required to respond to the Preliminary Notice of Violation and follow instructions specified in the Notice. DOE will determine if further action to ensure compliance with nuclear safety requirements is required after it reviews Westinghouse Savannah River Company's response. Enforcement actions can be found at the Office of Enforcement and Investigation website at <http://tis-nt.eh.doe.gov/enforce/>.

**KEYWORDS:** radiation protection, enforcement, Price-Anderson Act

**FUNCTIONAL AREAS:** Radiation Protection, Lessons Learned